

# Development In Business Simulation & Experiential Exercises, Volume 21, 1994

## ATTRIBUTES OF LEARNING ORGANIZATION: SIMULATING THE RELATIONSHIPS

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### ABSTRACT

For organizations to survive into the next millennium they must learn to adapt rapidly enough to meet the discontinuous changes brining about what Alvin Toffler calls the 'Third Wave'. That is, successful organizations must learn how to learn. To do this, a culture that is open, flexible, proactive, and experimentive must be established within the organization. But how can an organization fighting for its survival in to midst of Intense, global competition create such a culture?

This paper explores this question by focusing on the environmental conditions most conducive to learning. If the gist of organizational learning is 'detecting and correcting errors', what we the environmental conditions that most readily allow for this error detection. To this end, the paper proposes a process that combines diagnostic instrument, the Learning Organization Profile, with computer modeling to enable an organization to assess its ability to learn by identifying leaning enhancers and inhibitors within their environment<sup>1</sup>.

### INTRODUCTION

#### Purpose

The Initial question that provided the impetus for this research is whether the relationship between the subsystems of a learning organization (independent variables) and an organization's learning environment (dependent variables) is Unclear, or does it take some other form?

The purpose of this research is to provide the data that will enable organizations to determine what needs to be done to increase their Style to learn. This can be achieved by identifying the blocks to learning within an organization. Identifying these blocks will enable the organization to become more flexible, adaptive, open, and proactive, elements, which represent just some of the characteristics of a culture that would be conducive to organizational learning<sup>2</sup>.

Over the last ten years much has been written about the learning organization. Although there has been a phenomenal Increase in the awareness of the learning organization, we still do not have a truly clear picture of it, lot alone knowledge about how to create one. This paper suggests that although there are many elements to consider when attempting to create a learning organization, experimentation may play a critical role. Reich (1991) supports this by saying 'in order to learn the higher forms of abstraction and system thinking, one must learn to experiment. He goes on to say 'the habits and methods of experimentation are critical. In the new economy, where technologies, testes, and markets are in constant flux'.

A method which allows an organization to take a 'snap-shot of its current learning environment is proposed. This snapshot is obtained by having the organization complete the Learning Organization Profile (O'Brien, 1993), which measures an organization learning subsystems. The LOP is a 100 item pencil and paper Instrument. It is administered to organizational members in an attempt to obtain an understanding of the organization's current learning subsystems. The instrument consists of ten categories which, says the author Michael J. O'Brien, constitute the leaning subsystems of an organization. Table 1 is a listing of these subsystems as identified by the LOP.

TABLE 1  
LEARNING SUBSYSTEMS

Strategy and Vision <sup>1</sup>	Rewards and Recognition
Executive Practices	Training and Education
Managerial Practices <sup>2</sup>	individual and Teem Development
Interpersonal	Performance Goals and Feedback
Information	Organization and Job Structure

<sup>1</sup> The research on which this paper is based was still in progress at time of printing. The complete results of this effort will be presented at the ABSEL conference in March, 1994

<sup>2</sup> This paper uses the terms organizational learning and learning organization seemingly interchangeably. The reader is advised to consider the term learning organization to be the noun, the thing which the organization strives to be, by implpying the verb organizational learning.

Ithink™ is a software program designed to run within the Macintosh operating system. This software package has two modes. The first allows you to map the process. After applying mathematical relationships to the elements of the map, the second mode, modeling, allows for simulation of the process. Mapping is achieved with the program's building blocks, tools, and objects. Mathematical equations and/or graphical depictions are used to illustrate the way in which the elements of the map interact.

Each of the above subsystems consists of ten separate questions. Each question within a given subsystem seeks to determine the level of environmental characteristic, which is present in that subsystem.

After the snapshot is created, It is brought to life through computer modeling. The goal of this process is to provide organization with a safety net that will enable them to increase their ability to learn through experimentation. Further, It is expected that experimentation will become pervasive throughout the organization, creating a culture that is conducive to continual learning. The results from this research should provide Important data about to potential benefits of this process by determining the relationship between the organizational learning environment and its learning subsystems

### Background

Aire de Geus (1988), Royal Dutch Shell, has commented that 'the rate at which organizations learn may be the only source of sustainable competitive advantage'. Alvin Toffler (1993) speaks of the discontinuous changes bringing about what he terms the 'Third Wave', and that 'Second Wave organizations must move forward from their smoke-stack mentality by leaving to accept and flourish within an environment of decontinuous change.' The Global Business Network (1993) says that 'change lets worlds only constant and that sudden discontinuities alter our world in fundamental ways and then alter it again'. Chris Argyris (1992 writing about our tendency to create learning blocks says '...I think it is fair to say that we are intentionally creating a world full of self-reinforcing, anti-leaning processes that will overprotect the players so that It will be difficult to detect aid correct difficult and embarrassing problems'. Chutes Handy (1989) writes that "...changing is another word for earring' and tells us '...Learning is not finding out what people already know, but is solving our own problems for our own purposes, by questioning, thinking and testing until the solution is a now part of our lives'. If changing is synonymous with leaving what then must organizations do to hands the changes needed to become leaning organizations?

Double-loop learning. If they are going to be viable, organizations need to become learning organizations (Argyle and Schon, 1978). Organizations can do he by creating a culture that not only allows for, but fosters, questioning, hypothesizing, testing, and reflecting a culture where education is key organization value. In a culture are education is highly valued, the organization can begin to practice the double-loop learning that Argyris (1977, 1990, 1992) has proposed. This type of learning, Argyris contends, Is achieved through the testing, reflecting, and correcting of behaviors, actions, or theories. When an organization's simple corrective actions become more self-reflective, by questioning the wisdom of a particular course of action in the first place, they have begin to practice double-loop learning. Double-loop learning, then, enables an by placing feedback loops within the organizational structure. This allows the organization to monitor, and thus change, its activities and behaviors, which is imperative to becoming a learning organization

Double-loop leaning will require organizations to be open to questioning their current structure, methods and Indeed their wisdom, which wi require an increase in their ability to experiment. This is a difficult task, however, because as these organizations are seeking to lean how to lean, they must deal with the decontinuous changes within their environments, which makes experimenting more difficult to achieve as organizational members are afraid of making mistakes at such a critical time.

**Creating safety.** Creating a safe environment, where one can experiment with alternatives, make errors, and lean from ones errors, will be needed if organizations are to enhance their ability to learn how to learn. And safety, says Schein (1993), is needed to reduce the anxiety that blocks so many of us from now learnings, the fear associated with an Inability or unwillingness to learn something now because it is too difficult or disruptive. If an individual, and subsequently the organization, is going to learn, however, they will need to reduce he anxiety. Schein says this Is done by increasing a different type of anxiety, the fear, shame, or guilt associated with not leaning something new. Finally, Schein tells us that Insight alone is not sufficient to change our behavior, and that our behavior will not change until we have observed the results of our actions. The means that feedback, rapid enough for us to link our actions with the corresponding results, will be needed to achieve any lasting behavioral change

Modeling. Computer modeling can be used to provide needed feedback with sufficient speed to identify the link between our actions and their results. By allowing an individual to experiment with alternatives, and see the outcomes of those alternatives shortly after making the decisions, computer modeling enhances the individuals systemic understanding.

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That is, they begin to see connections between elements they never before considered associated. Although modeling has historically been used in the physical, social, and life sciences; its use in business has until recently, been limited to the analysis of "hard" variables. This limitation is giving way as technology that enables the measurement of "Softer" variables becomes available. By measuring and simulation soft variables, organizational members will begin to see and understand the interconnectedness between seemingly disparate organizational elements

An important component of this process, visual communication, has been widely researched by varied disciplines. It is beyond the scope of this paper to give a full accounting of this literature; however, some thoughts on the visual communication aspects of computer modeling and simulation are in order. For instance Alpers (1983) says that over 60% of our mental process power is devoted to visual processing. And McNeil (1992) contends that visualization process was key to enabling the ancient Chinese government bureaucracy to develop because of its use of ideograms to symbolize complex organizational processes. Latour (1986) makes the point that people go to great lengths to take complex visual data and transform it into something that can be quantified and turned into a comfortable cognitive artifact. Finke, Ward, & Smith (1992) tell us that mental model is another name for cognitive artifact. And that they can be thought of as "active constructions that represent the current or desired state of affairs, as well as information about how to get from one state to another."

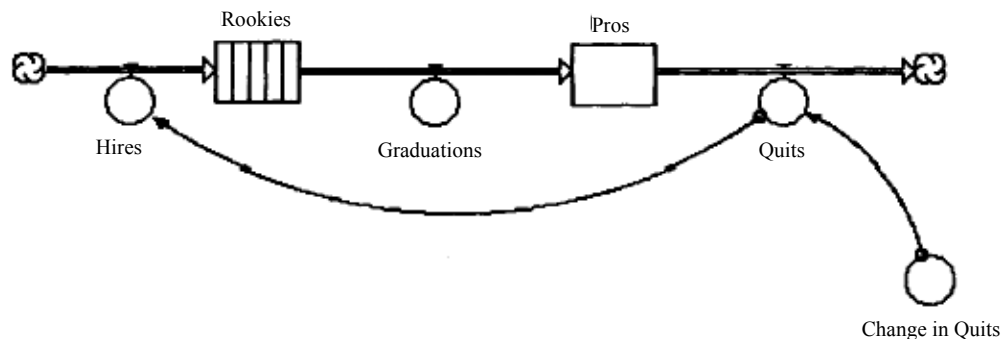
Using mental models should enhance an individuals feeling of safety, since they can experiment with alternatives in the comfort of their own mind. As the level of comfort with the use of mental models increases, they will feel less inhibited to verbally articulate these thoughts which should lead to an increased level of experimental behavior and subsequently real learning. In addition to an individuals mental models, computer modeling can be used to create a safety net that can help an organization's culture become more experimentive. An additional benefit of explicating an Individual's assumptions by visually depicting them, which is a by-product of the mapping process, is the understanding that occurs within the work group. We have all exclaimed at least once, what does she/he expect, I can't read his/her mind! When we articulate our mental models we no longer need to attempt fruitless mind reading.

Senge (1990) concurs when he says "explicating one's mental models is an important step to uncovering the fundamental reasons for beliefs and actions"

Advantages of mental models in problem solving are sighted by Glenberg, Meyer, and Lindem (1987) They say the advantages are that "they can be updated, can integrate information from a variety of sources, and can allow for the discovery of novel and emergent ideas. They go on to state that "[mental models] are ideal for many aspects of creative exploration, such as making predictions about hypothetical solutions, examining recommendations of various elements and considering extremes and limits of various situations" that is, use of mental models will allow us to predict the likely consequences of an action(s) before any physical effort or resource has been committed. In this way, the use of mental models will enhance experimentation with alternatives, which will enable learning to occur without the rear that de Geus (1988) says "Fences in our imagination" The critical role visualization to the mapping and modeling process proposed by this paper.

Software packages now available make it possible to measure and analyze less definable or "softer" elements; they can be visualized, and quantified vis the use of various computer programs. The itthink™ mapping and modeling program is a good example<sup>3</sup>. Through its use, an organization can map its perception of their current environment. The program operates under the premise that the elements within a system are stored at some point (s0 within the system. That is, the operating assumption is that of a stock and flow nature. The map in figure 2 depicts a very simple system. Specifically, the system of a human resources effort. The assumptions of this map are that: (1) individuals are hired; (2) they exit training and flow to graduation; (40 now they enter the Pros category where they stay until they; (5) quit and flow out of the system. The map also depicts the information flow between quits and hires, as well as the dynamic element, change in quits along with its own information flow.

FIGURE 2  
ROOKIE/PRO MODEL



After the mapping process is completed a mathematical model of to environment brings into life The modeling process takes the power of to mapping function one step higher by enabling organizations to experiment in ways that would otherwise be impossible. Figure 3, below, illustrates the graphic output of the previous map are depicted by graph lines one & two. Specifically, graph line one shows what can be expected to happen to the level of Pros within this system based on the assumptions of the mathematical model. Graph line two shows the same for the stock of Rookies. It is not hard to see that this system is going to have some problems maintaining equilibrium between the stocks of Pros and Rookies. The dynamic in this model is the change in quits. Its job is to introduce a one-time change in the amount of quits to occur in the third month. Prior to the one-time change in quits, the information flow between the quits and heirs elements acts to maintain the balance of heirs to quits so that the system stays in equilibrium. The effect of this one-time increase in the number of quits threw the system off such that hires could not catch up, and the Rookies finally peaked at 90, while the number of Pros within the system declined until they reached their low point at 20.

### Discussion

Learning organization defined. In a recent paper, Jones and Hendry (1992) offer a listing of themes in an attempt to paint a picture of the learning organization. Theirs themes have been extracted from a sample of definitions they cite in their recent paper: Transformation, change, participation, innovation, altering the way people work, adapting, management style, delegation, and fostering employee involvement Following are some of the definitions from which theirs themes have been extracted

#### *A Learning organization:*

\* "is an organization which facilitates the learning of all its members and continuously transforms itself."

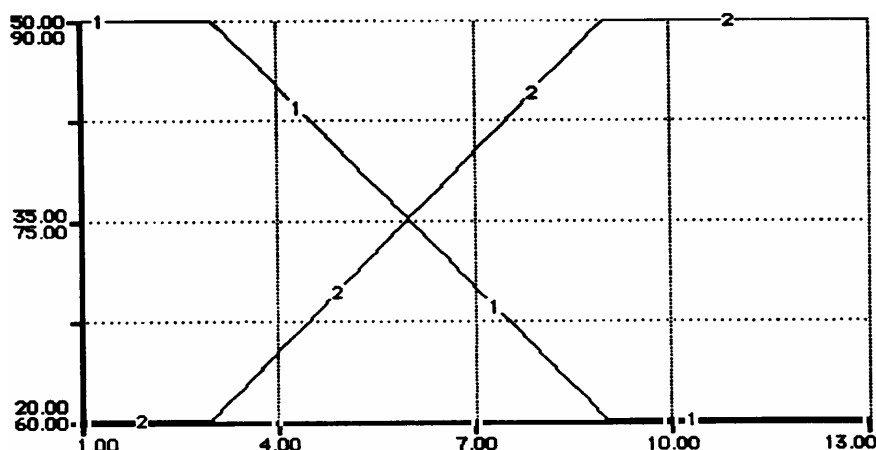
Pedler, Boydell, and Burgoyne (1988)

\* "facilitates participative (Horizontal) and innovative (vertical) development within and between people and institutions, commercially, technologically, and socially. It thereby transcends not only the business enterprise but also the hierarchical institution

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Lesson (1990)  
FIGURE 3  
ROOKIE/PRO OUTPUT GRAPH

1: Pros



*"builds and continually renews its competitiveness in all functions"*

-Penn (1990)

- *"may be just another label for good practice!"*

Bell (1991)

- *'emphasizes adaptability (which is) the first stage in moving forward toward learning organizations. This is why leading corporations are focusing on generative learning which is about creating, as well as, adaptive leaning, which is about coping*

Senge (1990)

The major themes from these definitions seem to point to an exploratory culture and an openness to questioning current solutions and processes (Argyris and Schon, 1978). Senge (1990) suggests this exploratory culture and openness is motivated by the dedication to continually expand one's ability to create the results truly desired. These definitions and themes, then, offer a framework for the effort of establishing a clear picture of the learning organization.

Relevant literature. The literature has a varied collection of definitions of learning, containing many distinct elements; however Shuell (1986) has articulated a definition that is broad enough to incorporate both the cognitive and behavioral theories. "Learning is an enduring change in behavior, or in the capacity to behave in a given fashion, which results from practice or other forms of experience." The element of focus here is the change in behavioral capacity, for learning involves "developing new behaviors or modifying existing ones"

Garvin (1993) proposed that organizational learning incorporates behavioral and cognitive theories of learning. He suggests that organizational learning moves through three 'overlapping stages'. The first and second stages are cognitive and behavioral learning and the third is performance improvement. Cognitive learning occurs first since organizational members are initially exposed to new ideas and begin to third differently. Behavioral learning occurs as organizational members internalize new learnings and begin to change their behavior. Finally, the performance review can be used to provide feedback needed to determine the effect these changes have had on a number of organizational functions.

Malcolm Knowles (1970) focuses on the appropriateness of the tenting method. He writes that the application of pedagogy, the art and science of teaching children, to the education of adults is a major reason that adult education has felled to meet its potential, and suggests we rethink our archaic conception of the purpose of education, namely the transmittal of knowledge. Knowles (1970) writes out a new theory, andragogy, emerging to replace pedagogy in adult education. The technology, 'the art and science of helping adults learn', is better suited to the needs of adult learners due to their 'problem-centeredness' orientation; they are motivated by the application of their new learnings to real-life problems they are currently experiencing.

Richmond (1992) discusses two additional orientations, our local *spatial* and temporal orientations and tells us that these are at the core of many of our ill-conceived business decisions. Overcoming these orientations will

be necessary for any organization seeking to compete effectively in today's more highly interdependent reality. Today, organizations must be able to understand how their local actions will affect not only themselves but others within the larger, 'non-local' environment. Gavin reiterates—Ball (1991) Richmond's message saying '[employees] must continually ask, how do we know that's true.... they must push beyond the obvious symptoms to assesses underlying causes often collecting evidence when conventional wisdom says it is not necessary'. This awareness represents a substantial departure from past habits of thought which historically have made the learning blocks so powerful. How can such habits of thought be overcome?

Nonaka (1988) suggests that the creation of chaos in an organization is an antecedent to the self-renewal that must take place to overcome the habits. To create chaos an organization needs to continually pose the question 'what do we live for?' to its members. Organizations with the ability to continually re-evaluate their assumptions aid decisions will have the ability to 'get outside the box' surrounding their habits of thought.

Charles Handy's Learning Wheel Theory suggests that we consider learning as a wheel that begins with questioning, learning to the theorizing, then to testing, and finally to reflection. The power of this model lays in reflection, causing more questions to emerge as impetus to yet another cycle with more re-evaluation. Since reflection leads to new questions, aid new leanings, why are so few of a., experiences today are reflected upon? Part of the answer lays within the perception that reflection 'just takes too much time'. Schon (1983) cites this as a reason why organizations generally do not have cultures fostering, even allowing for, much reflection.

Schein (1983) notes that at least three different types of learning are important to organizations at different points in their development (1) knowledge acquisition and insight (2) habit and skill learning, and (3) emotional conditioning and learned anxiety. The first type of learning is difficult to achieve, causing individuals to become frustrated and anxious. Culture is a big determinant of the second type of learning. The culture of management is built on the assumption that mistakes will occur, however, that the same mistake should never be made more than once. Habit and skill learning, however, take much practice and many mistakes before the new skill becomes learned. Here, Senge tells us that we can speed this kind of learning by providing practice fields and coaching in a psychologically safe environment. Lastly, emotional conditioning is the most potent type of learning of the three, and is associated with Pavlov's 'carrot versus stick' argument.

Pavlov showed that when a behavior is learned through fear, anxiety alone is sufficient to keep the behavior going even if additional stimulus is no longer administered. But when behavior is learned through reward. Unlearning of a behavior can occur much more easily. This means that avoidance behavior learned through punishment is more stable than behavior learned through reward. Behavior learned through punishment however, does not let the learner know what the 'correct' behavior is and is not conducive to trial and error learning. Therefore, when people are punished across a wide range of behaviors they are 'likely to limit themselves to narrow and safe ranges of behaviors for fear of making

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mistakes', which ultimately reduces their ability to achieve any new leanings. How then does an organization create a culture that enables reflection to occur?

The process explored in the paper enables people to step out of their day-to-day routine to question, hypothesize, test and reflect. This process enables learning to occur by reducing organizational members' fear of making mistakes. The ability of this process to compress time and space is critical so that the results of an individual's actions are made explicit; this feedback is critical to gaining an understanding of the power and interconnectedness of our actions. The mapping, modeling and simulation process, then, should be thought of as a methodology upon which burgeoning learning organizations can rely to practice, risk-free, the alone and behaviors that will speed up their ability to learn.

The goal of this process is to make complex systems understandable although many forms of modeling methods exist a central theme is discernible: provide feedback which clearly connects a person's actions with the results obtained. This goal fits well with Argyris and Schon's (1978) description of double-loop learning. Specifically, double-loop learning requires organizations to become self-reflective about what they should be doing opposed to what they have already done. Argyris and Schon chose a heating system as a metaphor to describe the concept. The thermostat is a single loop system because it seeks only to keep the system at a predetermined homeostasis. In systems theory this is known as a negative feedback loop. The equivalent double-loop system, however, would ask whether the temperature is at the best level for the given conditions.

Double-loop learning enables an organization to transform itself from a reactive to a proactive orientation for decision-making. This change signals a critical and necessary realization for organizations seeking to become learning organizations. From the research, then, a process will emerge that enables an organization to feel safe enough to experiment, view the results of its actions, and continue to learn by asking yet more questions. This process will have the way to continual learning by allowing individuals the confidence to learn by doing.

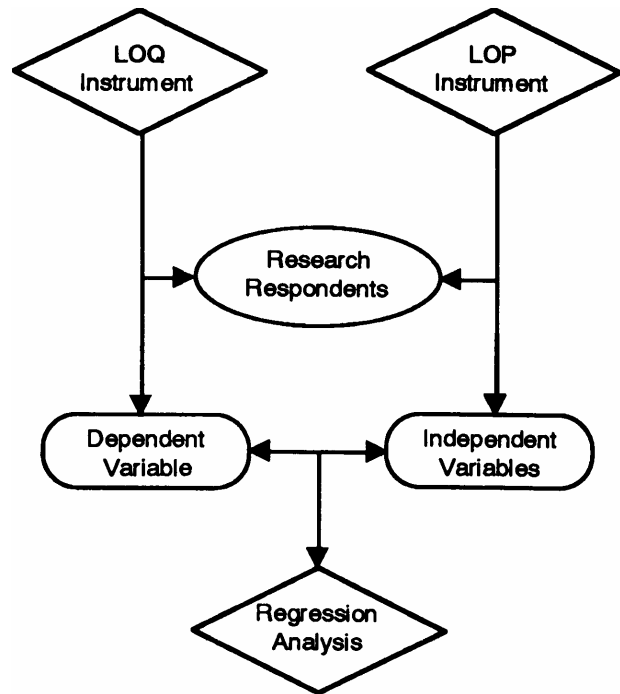
**Research design.** The study is designed as a survey research project to test the assumption of linearity between an organization's learning environment, and its learning subsystems. Linearity is defined by Berry and Feldman (1985) as '[an equal] amount of change in the mean value of Y associated with a unit increase in X, holding all other independent variables constant'. Conversely, if a given number of unit increases in an independent variable, X, yields different values of the dependent variable, Y, then the relationship between the two variables is said to be nonlinear. Since O'Brien's LOP assumes that each one of the learning subsystems, the independent variables, equally influence the overall learning environment of an organization, the dependent variable, the relationship between these is postulated to be linear and additive. The motivation to test the degree of linearity is predicated on the belief that this assumption presents a somewhat simplistic view of learning theory, organizational behavior, group dynamics and organizational learning.

The survey for this study uses two instruments: the Learning Organization Quotient (LOQ) and the Learning Organization Profile (LOP). The purpose of the LOQ is to yield scores on the dependent variable, a self-report measure of the degree to which the respondents' organization matches the description of a learning organization. The LOP provides scores on each of the ten independent variables. The LOP was created by Michael J. O'Brien, and was donated for use in this study.

After both parts of the survey are completed, a regression analysis will be conducted to determine the degree of linearity between the independent and dependent variables. Then, the data from the analysis will be applied to the *ithink*<sup>TM</sup> computer-modeling program. The model(s) that emerge from the effort will then be used to conduct 'what if' scenarios which illustrate the change in level of organizational learning that occurs when the structural and/or mathematical relationship among the subsystems are altered.

**Instrumentation.** There are two parts to the survey process. The LOQ instrument will be used to measure the level of dependent variable that exists in each subject's organization by asking each subject to rate, on a scale of 1-7, the degree to which his/her organization matches our definition of a learning organization. This definition was extracted from an extensive review of the literature. The LOP will be used to determine the degree to which the subjects' organization possesses each one of the independent variables. That is, the level of learning subsystem that exists within the organization. Please refer to Table 1 for a listing of the independent variables which are the subsystems of the LOP. Figure 4, below, depicts the relationship between these two instruments and the overall research process.

FIGURE 4  
INSTRUMENTATION



*Procedures* The steps for this study are

- Subject selection
- Data collection for dependent variable
- Data collection for independent variables
- Data analysis (regression)
- Creation of *ithink*<sup>TM</sup> map and model
- Execution of 'what-if?' scenarios

It should be helpful to expand briefly on each step of the research process.

**Subject selection** will be conducted via use of a purposive sampling method (Babbie, 1992). This method will be augmented by the use of snowball sampling (Babbie, 1992). Purposive sampling is used because of the need to identify those organizations/subjects that have knowledge of the subject, snowball sampling because the individuals initially queried are also asked to recommend someone they know who has an interest in and knowledge of learning organizations.

The dependent variable is measured by the degree of match between our definition of a learning organization, and the subject's own organization.

The measurement of the comparison is made on a seven point scale, with a score of 1 representing a poor match, and 7 a good match, between the two organizations.

The independent variables for the study are the subsystems of the LOP. Each of the ten subsystems contain ten of the 100 items that comprise the LOP. The items of the LOP instrument measure the independent variables within the respondents' organization.

The data analysis will provide the information needed to determine the degree of linearity between the learning subsystems (independent variable) and overall level of organization learning (dependent variable). The information will also enable the completion of the maps and models, which reflect the relationships among the independent and dependent variables.

The map and model creation occurs during the entire research process. After completion of the data analysis, maps that reflect the actual data will be created. Specifically, the quadratic equations that emerge from the regression analysis will be applied as the mathematical relationships of the model.

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## Conclusions and Future Work

The LOP snap-shot The data provided from the LOP by itself is valuable for an organization in that it will give the organization an understanding of how each earning subsystem rates in comparison to other subsystems. Later, as more data is gathered, an organization will be able to compare their respective subsystem scores against similar organizations within the same Industry. This ability will assist the organization by providing baseline measures against which they can compare their ~i subsystem areas. Identification of the weaker subsystems is the first step toward planting interventions to strengthen these areas

**Mapping, modeling and simulation.** A powerful function of this process lays in the seemingly unimportant task of mapping the organizations current system. Through this effort important insights emerge for the Individuals involved in this process. Specifically, individual's mental models are explicated through this process, which enhances an Individual's understanding of the assumptions held by themselves and others. This understanding should then lead to questions about the fundamental relationships between the elements within the system.

This questioning provides impetus for the next phase of the process modeling Like mapping, modeling relays on the visual communication process, however it goes one step further. Specifically, modeling requires the participants to think about how the relationship depicted in the map actually work. To answer these questions, mathematical and/or graphic relationship must be created to depict the nature of the relationships. The effort inevitably leads to disagreements about the nature of the relationships, which lead nicely into the final phase of the process; simulation.

The simulation process provides answers to why the elements within a system act as they do. By conducting 'what-if scenarios, participants can test their own mental models in real time, and view the results of their actions. That is, the 'what if' analyses will illustrate the effect(s) on an organization's overall leaning system when changes are made to selected variables. For instance, if it was suggested by a group member that a particular map does not correctly depict the system, the Individual could reconstruct the map to reflect his/her thoughts. After building the new map, simulations would be conducted to determine the system changes brought about by the change in relationships among the elements of the map.

**Organizations benefit** The benefit from the ability to first identity, then simulate the learning blockages within an organization seems obvious; however, there are some long-term, more subtle, benefits that should be highlighted. As members of the organization get used to the modeling process, the fear of trying something new will begin to dissipate. Organizational members will begin to understand that trying something new can be rewarding, even fun. This experience will motivate the individual to be more open to new Ideas and alternatives. This openness will lead to a greater level of experimentation within the environment And with the increase in experimentation, the organization will begin to break those habits of thought that have become such formidable blocks to leaning for the organization. By breaking these habits of thought, the organization will start thinking outside of the 'box that has narrowed the scope of Its past alternatives. By breaking out of this box, then, the organization begins a paradigm shift that can lead the way to continual learning.

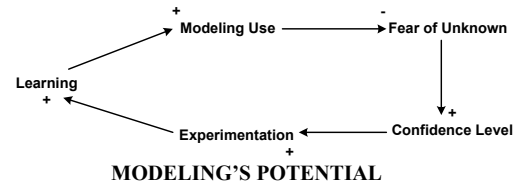
Figure 5, below, attempts to graphically illustrate the preceding statement The figure is offered as a closing thought about the potential he process offers and will hopefully motivate individuals to consider the possibilities for organizations that seek to continually expand their ability to lean.

## Future work.

Following are the major categories that have emerged as areas for which additional research is needed. The motivation for he additional research Is predicated on the belief that he information is needed for organizations to be able to, as Argyris say, detect and correct the errors that are inhibiting organizational leaning.

FIGURE 5

FIGURE 5  
MODELING'S POTENTIAL



Completeness and correctness of items - the research began to take form, a nagging question kept surfacing, 'how does one know that the 100 items in the LOP represent all elements of a leaning organization'? Of course this question is beyond the scope of he paper, and the assumption that the categories of the LOP are complete was accepted for purposes of this research. The question, however, still remains. In order to answer he question, and assure the completeness of the subsystem categories it will be necessary to conduct a study where the subsystems of the Leaning Organization Profile act as the dependent variables. The will enable us to view the effect on the variables of changes in any new Independent variables that emerge. An example of a new independent variable that could emerge is the amount of money spent on training each, year. Another could be the size of the Human Resource staff. Identification of new variables that show a strong correlation to the existing variables will help to determine the completeness of the existing subsystem pool.

Explicating mental models As the research unfolded, it became apparent that the assumptions we hold shape our actions in a powerful way. The specifics, however, remain unknown For instance questions regarding the value of knowing other's mental models emerged. For instance, if someone leaned that a workmate held a certain mental model, and that mental modal was not in want with theirs, would dialogue occur, or would the two just cease talking altogether? if dialogue does occur, what made it happen? Additionally, does dialogues necessarily mean that alternatives ways of thinking will be embraced? Qualitative research could be conducted that seeks to determine the answers to the questions observing interaction patterns among group members in controlled environments.

'Cross-cultural differences-Although some of the data used In this research came from the U.K., the size of this sample is not sufficient to conduct an analysis with the casting data. As with any research, we must ask ourselves if the results that were achieved can be generalized across various cultures. The purpose of the suggested comparison is to analyze the differences, if any, that exist along cultural lines. Knowledge of any differences that exist would be helpful in devising Intervention efforts for various cultures.

\*Inter-organizational differences Data is needed for an analysis at different levels within the same organization. The analysis will help to answer many questions about how leaning Is perceived at various levels of an organization. For Instance, it will be Important to see what correlation cast if any, between size of the LOG score and level of respondent And whether specific subsystem, LOP, scores are correlated to respondent level will shed light on any systematic respondent differences that may exist.

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